

chamber in a positive head height detection biased state before establishing the path from the pump chamber to the component of interest.

**274.** The method of claim **269**, wherein the method further comprises comparing the determined height wise location to an expected range and generating an error signal when the predicted characteristic is outside of the expected range.

**275.** The method of claim **269**, where the method further comprises using a behavior model.

**276.** The method of claim **275** wherein, the behavior model is based off an ideal second order under dampened system.

**277.** The method of claim **269**, wherein detecting the feature profile comprises detecting one or more pressure peak.

**278.** The method of claim **269**, wherein detecting the feature profile comprises detecting a first pressure peak and a second pressure peak lower in magnitude than the first peak.

**279.** The method of claim **269**, wherein the method further comprises setting an adjusted pumping pressure value based on the heightwise location of the component of interest.

**280.** The method of claim **269**, wherein the method further comprises orchestrating pumping of fluid through the pumping cassette via actuation of one or more pneumatic valves in the pressure distribution module associated with a second pump chamber in the pumping cassette while detecting the feature profile.

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